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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/172,553 | 10/14/1998 | JAMES E. GREEN | 2914.IUS | 9441 |

7590 10/22/2002

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EXAMINER

DIAZ, JOSE R

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 10/22/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

| | | | |
|-----------------|-------------|--------------|--------------|
| Application No. | 09/172,553 | Applicant(s) | GREEN ET AL. |
| Examiner | José R Diaz | Art Unit | 2815 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 30 September 2002.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 31-35 and 37-45 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 31-35, 37-45 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.

2. Certified copies of the priority documents have been received in Application No. _____.

3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) Notice of References Cited (PTO-892) 4) Interview Summary (PTO-413) Paper No(s). _____.

2) Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) Notice of Informal Patent Application (PTO-152)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. 6) Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

➤ A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 8, 2002 has been entered.

Claim Rejections - 35 USC § 112

➤ The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

➤ Claims 33-34, 37-41 and 44-45 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claimed steps of providing a HSG polysilicon layer on the storage poly structure and lining the recesses with a dielectric material are not supported by Applicant's Specification. Applicant argues in the "Remarks" that "nowhere does the specification indicate the removal of the remaining HSG layer 122 (see Specification, page 8, lines 19-26)." After a further review of the Specification, including the portion cited by Applicant, the Examiner agrees with Applicant that the Specification does not

provide a written description of the presence of the layer HSG before the step of depositing a dielectric material 138. As a matter of fact, nowhere except in the drawings, does Applicant point out the status of the HSG layer before the dielectric material 138 is deposited. For example, Figure 8 shows that a portion of the HSG 122 remains covered by the mask 124 after the storage poly 120 is etched. However, Figure 9 shows an etched structure 132 in which the HSG is completely removed from the surface of the storage poly 120. Figure 10 also shows the dielectric material 138 deposited over the structure in which the HSG is again completely removed. Even if the Examiner considers the fact that Applicant stated on page 6, lines 16-21 that "the figures presented in conjunction with this description (with the exception of FIGs. 22-23) are not meant to be actual cross-sectional views...but merely idealized representations..." one of ordinary skill in the art is not forced to conclude from the sequence steps described in the written Specification and the Figures 1-21 that the HSG remains over the structure before the dielectric material is deposited. Rather, at best the Specification and Figures 1-21 create an ambiguity. But, from the teaching of Figure 22 and 23, which are an actual representation of the structure after the steps of etching the storage poly and removing any remaining mask layer material 124, it is clearly shown that, in fact, the HSG layer is not present on the storage poly structure (see Figure 23). Thus, in absence of any other evidence, the Examiner considers that the layer of HSG was in fact removed from the device before the dielectric material was deposited, and therefore, any other teaching contrary to this fact is considered not supported by the written description.

Claim Rejections - 35 USC § 102

➤ The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

➤ Claims 31-35 are rejected under 35 U.S.C. 102(b) as being anticipated by Wood et al. (US Patent No. 5,405,799).

Regarding claims 31-32, Wood et al. teach a semiconductor capacitor storage poly (see Figure 2) comprising: downwardly extending recesses (see Figure 6); and a plurality of contiguous mesas (18,19) extending in the X, Y and Z coordinates (see Figure 6) and comprising a plurality of contiguous top surfaces (18, 23) forming a maze-like structure (see Figures 2 and 10).

Regarding claims 33-34, Wood et al. teach a semiconductor capacitor storage poly (see Figure 2) comprising: downwardly extending recesses (see Figure 6); a plurality of contiguous mesas (19, 23) extending in the X, Y and Z coordinates and forming a maze-like structure (see Figures 2 and 6) and hemispherical-grain polysilicon (18) on at least some of said plurality of contiguous top surfaces (see Figures 6 and 10).

Regarding claims 35, Wood et al. teach an intermediate semiconductor capacitor structure (see Figure 8) comprising: a storage poly structure (16, 19) with recess formed therein (consider the space between the mesas 19 in Figure 8); a contiguous hemispherical-grain polysilicon (18) over said storage poly structure (see Figures 8 and 10) and a mask (20, 21) over said hemispherical-grain polysilicon layer, said recesses

(consider the recess not covered by the mask (20, 21)) being exposed through said contiguous hemispherical-grain polysilicon (18) and said mask (20, 21) (see Figure 8).

➤ Claim 35 and 37-45 are rejected under 35 U.S.C. 102(b) as being anticipated by Kenney (US Patent No. 5,254,503).

Regarding claims 35, 42 and 43, Kenney teaches an intermediate semiconductor capacitor structure (see Figure 4) comprising: a storage poly structure (10) with recess (20) formed therein (see Figure 4); a contiguous hemispherical-grain polysilicon (14) over said storage poly structure (see Figures 1-4) and a mask (16, 18) over said hemispherical-grain polysilicon layer (see Figures 1-4), said recesses (20) being exposed through said contiguous hemispherical-grain polysilicon (14) and said mask (18) (see Figure 4).

Regarding claim 37, Kenney teaches an intermediate semiconductor capacitor structure (see Figure 4 and 6) comprising: a storage poly structure (10); low elevation regions of a hemispherical-grain polysilicon (14) on said storage poly structure; recesses (20) formed in said storage poly structure and located laterally between said low elevation regions of said hemispherical-grain polysilicon layer (see Figure 4); and a dielectric material (22) at least lining the recesses (see Figure 6).

Regarding claims 38, 40, 44 and 45, Kenney teaches an intermediate semiconductor capacitor structure (see Figure 4 and 6) comprising: a storage poly structure (10); low elevation regions of a hemispherical-grain polysilicon (14) on said storage poly structure; recesses (20) formed in said storage poly structure and located

laterally between said low elevation regions of said hemispherical-grain polysilicon layer (see Figure 4); and a dielectric material (22) substantially coating an upper surface of said storage poly structure and lining each of said plurality of recesses (see Figure 6).

Regarding claim 39, Kenney teaches a cell poly structure (24) over the dielectric layer (see Figure 6).

Regarding claim 41, Kenney teaches that at least some of the plurality of recesses (20) extends into said storage poly structure (10) (see Figure 4).

➤ Claim 42 is rejected under 35 U.S.C. 102(b) as being anticipated by Ahn et al. (US Patent No. 5,358,888).

Regarding claim 42, Ahn et al. teach a semiconductor capacitor storage poly (see Figure 17) comprising: a storage poly structure (40, 50), a substantially confluent HSG layer (80), and a mask (70, 56), wherein elevated portions of said HSG are exposed downwardly extending recesses (consider the HSG not covered by the mask 70, 56 in Figure 17).

Response to Arguments

➤ Applicant's arguments with respect to claims 31-35 and 37-45 have been considered but are moot in view of the new ground(s) of rejection. With regards to the arguments that the reference Kenney does not teach a contiguous HSG layer since the HSG (14) are islands in which the bottom surfaces contact only separate portions of region 12 (see page 7 of the remarks), Applicant should note that such a region 12 is not described in the embodiment shown in Figure 4, but it is described in a alternate

embodiment shown in Figure 5. As shown in Figure 4, the HSG layer (14) is formed directly over the poly structure (10) and share the same upper surface of the poly structure (10), which agrees with the definition of the term "contiguous" as stated in the Office action mailed on June 25, 2002. Therefore, Kenney anticipates the claimed limitation.

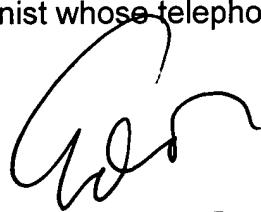
Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to José R Díaz whose telephone number is (703) 308-6078. The examiner can normally be reached on 9:00-5:00 Monday, Tuesday, Thursday and Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 746-3891 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JRD
October 18, 2002



EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800